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Abstract

We study empirically the impact of social indicators on growth in the context of FDI and trade. In this article, we argue that the positive growth effects of FDI and trade arise from factors such as knowledge spillovers or technological upgrading. Therefore, the effect of FDI and trade depends on the structural and sectoral investment composition, which depends in turn on social indicators such as income inequality, human development, education, and health.

Keywords:
growth, FDI, social development

JEL:
F20, E66, F43

1. Introduction

Since the pioneering empirical work of Barro (1991) growth theory has become a popular field, but the renewed growth theory is not often preoccupied with empirical questions relating to social development. This lack of interest has resulted in a limited number of empirical studies, in which traditional inputs are complemented with social indicators. Therefore, as argued by Temple (1999) there is no progression in this area. He concludes that there is a dominant role for research on the relation between social indicators and economic growth.

This article is motivated by this need - we study the impact of social indicators on growth in the context of FDI and trade. We argue that the positive growth effects of FDI and trade arise from factors such as knowledge spillovers or technological upgrading. The presence of foreign competition results in positive external effects in the host market, where local companies benefit from the transfer of knowledge or independently develop new technologies. Therefore, the effect of FDI and trade on growth depends on the structural and sectoral investment composition, which depends in turn on social indicators such as income inequality, human development, education, and health.

First, we review the literature on the impact of variables employed in the analysis of growth. Second, we carry out an empirical investigation, based on regressing the growth rate on a broad set of explanatory variables relating to variables of interest. Using this methodology it is possible to test whether countries with lower levels of social development as portrayed by our social indicators, do exhibit a lower rate of growth.

1. Literature review and discussion of hypotheses

There are numerous theoretical and empirical studies on the determinants of growth. Theoretical studies are classified into exogenous growth models and endogenous growth models. Empirical studies use either cross-section or time series techniques to estimate the validity of these models.

The main assumption of the neoclassical model is the law of diminishing returns to labour and capital. This has two implications. First, factor accumulation explains only short-term fluctuations of economic growth around its steady-state rate. Second, for a given saving rate, poor countries are likely to grow faster than richer ones, fostering convergence of per capita GDP among countries in the long run. In this setting, the

differences in long-term growth across countries cannot be explained by the growth rate of savings, but rather by exogenous technological advancement. Still, the results of the empirical literature have been mixed. In particular, the neoclassical growth variables, such as rates of growth of physical capital and labour force explain only a small share of variation in growth. Researchers have employed different combinations of right-hand-side variables in order to solve this problem. With this in mind, let us now turn to review of literature on the impact of FDI, trade, and social indicators on growth.

The theoretical literature proposes a number of arguments for FDI having a positive impact on growth. The starting point is commonly an endogenous growth model in which FDI gets a role in raising technology levels. First, FDI is considered to be an international technology transfer that increases productivity - multinational companies operate with superior technologies and managerial practices. Second, foreign firms increase competition and induce local firms to become more productive. Third, foreign firms invest in training of the workforce thereby improving qualifications in the country's labour market (Borensztein et al. 1998, Markusen and Venables 1999).

Empirical studies on the impact of FDI see it as a catalyst facilitating economic growth. This view is supported by regressions where FDI indicators are correlated with growth such as Borensztein et al. (1998). Kneller and Stevens (2006) attribute differences in absorptive capacity and hence in the level of productivity to differences in human capital and R&D. Aghion et al. (2005) point towards the degree of openness to FDI as a precondition of convergence. However, some literature suggests that this effect is subject to certain conditions in the country of destination. Borensztein et al. (1998) show that FDI has a positive impact on growth in a country only if it exhibits high level of human capital. Carkovic and Levine (2002) show that human capital and income level determine the growth impact of FDI while Fillat-Castejon and Wörz (2006) look at the openness of an economy as a condition for the growth effect of FDI. We consider that there are many more factors that may be critical in explaining the growth impact of FDI. Therefore, in contrast to earlier studies looking at general indicators as conditional factors for FDI, we shall investigate the impact of FDI conditioned on a variety of social indicators.

It has been established that trade openness, our second variable of interest, affects growth positively, since it magnifies the benefits of international knowledge spillovers and technological diffusion. Technology transfer occurs via the import of high-tech capital goods, patents, and licenses, as well as knowledge-intensive services.

It also enforces cost discipline through import competition and thus increases productivity. In addition, the export led growth hypothesis states that the export sector generates positive externalities on other sectors through more efficient production techniques and by exploiting scale economies. Endogenous growth theory extends this analysis by emphasizing the role of exports on technological innovation and dynamic learning.

The empirical research is supportive of the idea that more trade promotes growth. Irwin and Tervio (2002) find that the main result of Frankel and Romer (1999) is confirmed for the whole century: countries that trade have higher incomes. Salinas and Aksoy (2006) calculate that annual GDP growth rates increased by up to 2.6 percentage points after trade liberalization.

Now we discuss the role of social indicators in the following order: health, inequality, human development, education. There is a consensus that improving health of poor will lead to economic gains and hope for such outcome is given as a justification for health initiatives. This runs in favour of microeconomic evidence showing that one's health is an important determinant of individual economic performance. However, microeconomic studies are unable to control for general equilibrium effects of changes in health. Thus there is scepticism concerning the short-run effects of health policy interventions on long-run growth, because of their side-effects of increased fertility and population growth. Acemoglu and Johnson (2007) argue that, when the issues of health's endogeneity are taken into account, health improvements in the period after WW II actually had a negative effect on income.

There is no agreement how growth and inequality are linked. The Kuznets hypothesis (1955) states that investment in physical capital is the main driver of growth. Inequality encourages this growth by allocating resources towards those who save and invest the most. The endogenous growth models argue that inequality has a negative impact on growth through many transmission channels, for instance imperfection of capital markets (Aghion and Bolton 1997), investment impeding redistribution (Alesina and Rodrik 1994), political and social instability associated with high inequality (Alesina et al. 1996). The lack of explanation of the relationship between inequality and growth makes the investigation of this issue important.

Better economic performance could bring improvements in human development, yet, much less attention has been given to the opposite relationship, though it is frequently hypothesized, that human development brings about economic growth. The

only paper, which investigates the issue empirically, is by Ranis and Stewart (2005). They make a case that the economic growth is not sustainable without improvement in HDI. Their input however has a limited sample of countries and the estimation method (cross section) may be not enough to provide backing to such arguments.

Based on microeconomic evidence of a relationship between education and earnings, most growth studies include education. Yet, an important distinction is the one between private and social returns to education. Private returns relate to benefits acquired by the individual such as higher earnings, lower unemployment, and job satisfaction. Barro and Sala-i-Martin (2004) found a significant positive association between cross-national differences in the level of education and growth. However, other studies failed to find such an association - this has been used as a basis for rejecting the macroeconomic evidence and for arguing that the concentration of governments on raising levels of literacy and average educational attainment has been pointless (Easterly, 2001). Therefore, the expected relation is not clear.

The standard set of control hypotheses, derived from models of endogenous growth and used in almost all studies, states that investment rates are correlated with growth, the rate of time preference (proxied by life expectancy) affects growth negatively, and there exists conditional convergence. Moreover, population growth rates, common rate of technical change, and a common depreciation rate are positively correlated with growth. Empirical applications use the saving rate proxied by the investment rate and population growth rate plus 0.05, where 0.05 represents the sum of a common exogenous rate of technical change and a common depreciation rate.

2. Model specification and estimation methods

The estimated growth equation has the following form:

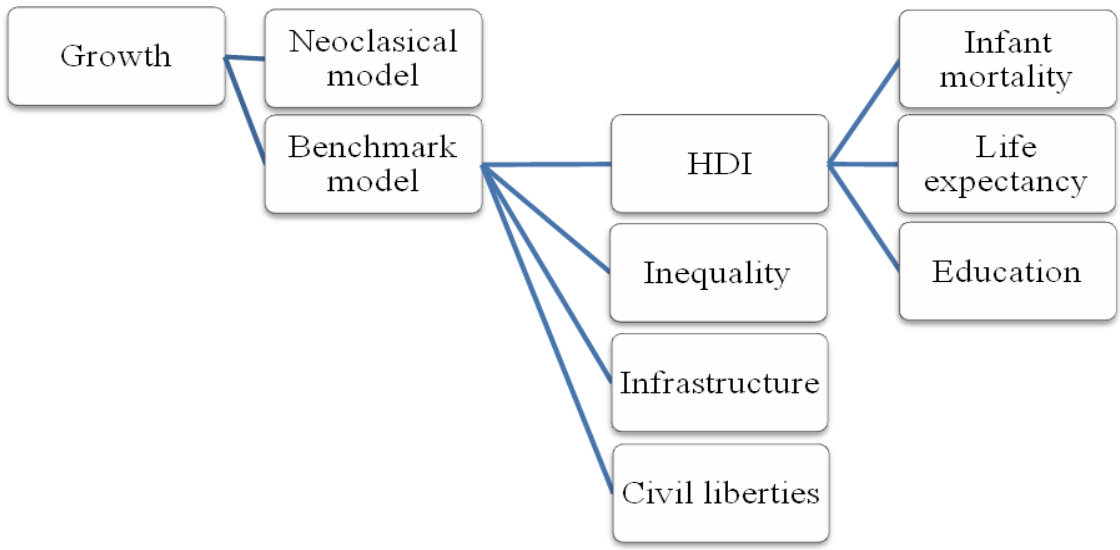
$$\Delta y_{it} = \gamma_t + (\alpha - 1) y_{i,t-1} + x'_{it}\,\beta + \eta_{it} + v_{it} \quad \text{for } i = 1,...,N \text{ and } t = 3,...,T. \tag{1}$$

where Δy_{it} is the log difference in per capita GDP over a five year period, $y_{i,t-1}$ is the logarithm of per capita GDP at the start of that period, and x_{it} is a vector of characteristics measured during or at the start of the period, β_j, for j = 0, 1, 2 and α_j for $j=1,...,p$, are the regression coefficients. Among other things, the unobserved

country-specific effects η_{it} reflect differences in the initial level of efficiency, while the period-specific intercepts, γ_t, capture productivity changes that are common to all countries, v_{it} is the i.i.d. error term.

The use of dynamic panel GMM was not possible in the investigation. Both Sargan tests detected problems with instrument validity, possibly due to short *T*. Therefore, standard Fixed-Effects (FE) approach was used. Errors are autocorrelation and heteroskedasticity consistent. The sample covers the period 1980-2005. The time dimension of panel growth regressions is typically chosen to be 5 years to avoid short-term business cycles (Bond et al. 2001). The sample covers more than 150 countries – only countries with population below 200 thousand were excluded from the dataset. Figure 1 presents the empirical procedure for the growth model.

Figure 1. Growth model – empirical procedure



Source: own

Two sets of estimation results are presented in Table 1- the general results of the neoclassical and benchmark open-economy model. First, log difference of GDP per capita is regressed on lag of logarithm of GDP per capita, lagged values of the investment rate, population growth, technical progress, and depreciation. Second, the benchmark model is estimated. Log difference of GDP per capita is regressed additionally on inflation, life expectancy, exchange rate volatility, government consumption share of GDP, FDI, and openness.

The obtained results are similar to other examples in the literature – i.e. obtained by Caselli et al. (1996) and Bond et al (2001). The estimated coefficients of control variables have generally the expected signs, though they are not robust. However the differences between corresponding coefficient estimates are small relative to their standard errors. The FE estimate of the autoregressive variable, implies conditional convergence. Caselli et al. (1996) suggest that the high rate of convergence implied by such result favours open economy versions of growth models. The positive and significant sign and large magnitude of the investment rate favours the endogenous version of the growth model.

Table 1. The growth model – classical vs. benchmark model

	GDP_pcGrowth	
	1	2
LaggedGDP	-0.365***	-0.379***
	(0.04)	(0.04)
InvestmentGDP	0.007***	0.007***
	(0.00)	(0.00)
PopulationGrowth	-0.066	0.030
	(0.17)	(0.15)
lnInflation		-0.053***
		(0.02)
ExchangeRate_StdDev		0.224
		(0.08)
Openness		0.105***
		(0.03)
FDI_GDP		0.003**
		(0.00)
GovConsumptionGDP		-0.003*
		(0.00)
_Inum5_3	0.012	0.017
	(0.01)	(0.01)
_Inum5_4	0.040***	0.025*
	(0.01)	(0.01)
_Inum5_5	0.121***	0.085
	(0.02)	(0.02)
_Inum5_6	0.153***	0.114
	(0.02)	(0.02)
_cons	2.922***	3.248***
	(0.00)	(0.31)
No of observations	788	644
R-squared	0.412	0.526
No of countries	173	154

Source: own,
Notes: *** significance at 1%, ** 5%, * 10%.

Turning to the first variables of interest, the FDI share and openness are both significant. The estimated coefficients have the expected positive signs and are large in

economic magnitude. Now, an investigation of the direct effects of social indicators is performed. First, the impact of HDI is estimated. The result is shown in the second column of Table 2. In all specifications, the HDI variable was significant and of the positive, hypothesized sign. The inclusion of HDI has rendered some of the control variables – government consumption and exchange rate volatility - insignificant.

Several critics have noted that the HDI does not take into account income inequality. To answer this, a proxy for income inequality was tested alongside HDI. The variable measured by Gini coefficient was insignificant in all tested specifications. Exclusion of HDI or other variables did not change the result. In fact, this effect was robust to the inclusion of other measures, as shown in the third column of Table 2.

It could be argued, that the HDI is an aggregate measure with arbitrary chosen weights. In response, the HDI was disaggregated into its components, which were then tested separately. These components in addition to GDP include measures of education, life expectancy, and health.

The first tested HDI component was health. We used a proxy for the existence of basic health services – infant mortality rate per 1000 live births and life expectancy as a proxy for more sophisticated health care. The results are shown in Table 2 in the 4^{th} column and 6^{th} column. Both health variables were not statistically significant. This result was robust to the inclusion of other variables. There is no evidence that even a large increase in these variables would lead to an increase in economic growth.

The second component - education - was proxied with the average years of schooling. These results (the variable is insignificant) are presented in the 5^{th} column. Other measures of education, including one of the HDI components that considers adult illiteracy were insignificant. Still, improvements in educational activity improve workforce quality after 10–15 years, until the people who are being educated enter the labour force. Therefore, instantaneous correlation could be impossible to find. There could be also an error in the choice of the proxies, since low quality of education can produce small increase of productivity, despite growing schooling attendance.

Table 2. Social indicators and growth

	GDP_pcGrowth								
	1	2	3	4	5	6	7	8	9
LaggedGDP	-0.379***	-0.365***	-0.622***	-0.370** *	-0.248** *	-0.370***	-0.248***	-0.371***	-0.378***
	(0.04)	(0.05)	(0.08)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
InvestmentGDP	0.007***	0.008***	0.009***	0.007***	0.006***	0.008***	0.006***	0.007***	0.007***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
PopulationGrowth	0.030	-0.212	0.908***	0.121	0.095	0.018	-0.038	0.127	0.027
	(0.15)	(0.15)	(0.35)	(0.15)	(0.17)	(0.17)	(0.23)	(0.15)	(0.15)
lnInflation	-0.053***	-0.033**	-0.050***	-0.054***	-0.040***	-0.053***	-0.038***	-0.055***	-0.053***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
ExchangeRate_StdDev	0.224***	0.132	1.008**	0.224***	0.080	0.226	0.054	0.226***	0.224***
	(0.08)	(0.02)	(0.48)	(0.09)	(0.11)	(0.22)	(0.11)	(0.09)	(0.08)
Openness	0.105***	0.081*	0.215***	0.093***	0.074*	0.093***	0.069*	0.110***	0.107***
	(0.03)	(0.04)	(0.04)	(0.04)	(0.08)	(0.04)	(0.04)	(0.04)	(0.04)
FDI_GDP	0.003**	0.003***	0.001***	0.003**	0.002	0.004***	0.002	0.004**	0.003**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
GovConsumptionGDP	-0.003*	-0.005**	-0.006**	-0.003*	-0.004*	-0.003*	-0.004*	-0.004*	-0.003
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
HDI		0.613***	1.971***						
		(0.00)	(0.39)						
Gini			0.049						
			(0.06)						
InfantMortality				0.000			0.000		
				(0.00)			(0.00)		
AverageSchooling					0.005		0.003		
					(0.04)		(0.05)		
LifeExpectancy						0.028	0.195		
						(0.07)	(0.14)		
lnTelephone_pc								0.007	
								(0.01)	
CivilLiberties									-0.002
									(0.02)
_Inum5_2			-0.053		-0.064***		-0.060***		-0.113***
			(0.04)		(0.02)		(0.02)		(0.02)
_Inum5_3	0.017	0.089	-0.053	0.019	-0.051***	0.016	-0.049***	0.011	-0.096
	(0.01)	(0.01)	(0.03)	(0.11)	(0.02)	(0.01)	(0.02)	(0.01)	(0.02)
_Inum5_4	0.025**	0.012	-0.042*	0.030**	-0.019**	0.024*	-0.018*	0.014	-0.089***
	(0.01)	(0.02)	(0.03)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
_Inum5_5	0.085***	0.045**	-0.029	0.092***		0.085***		0.065	-0.028**
	(0.02)	(0.02)	(0.02)	(0.02)		(0.02)		(0.03)	(0.01)
_Inum5_6	0.114***	0.062**		0.122***		0.114***		0.089*	
	(0.02)	(0.02)		(0.02)		(0.11)		(0.03)	
_cons	3.248***	2.796***	3.81789***	3.157***	2.246***	3.049***	1.419**	3.100***	3.357***
	(0.31)	(0.00)	(0.68)	(0.32)	(0.35)	(0.44)	(0.68)	(0.34)	(0.33)
No of observations	644	498	225	353	636	638	350	638	641
R-squared	0.5265	0.488	0.660	0.482	0.526	0.535	0.488	0.520	0.526
No of countries	154	145	114	97	153	154	96	154	153

Source: own,
Notes: *** significance at 1%, ** 5%, * 10%.

Now let us turn to a combined HDI components estimation. The results (7th column in Table 2) from this model replicate the results from HDI components estimated separately. None of the social variables is significant. Moreover, when the social variables are included, the FDI and openness variables become insignificant. The interplay between FDI, openness, and these variables may be the transmission channel of social development on growth.

When it comes to robustness - usage of different control variables did not change the results concerning social development. Although a parsimonious specification was considered given no theoretical models of growth and social development and few correctly estimated empirical models, all tests for specification and instruments validity suggest that the selected model is well specified. The estimated coefficients can be seen to be similar, which again suggests no serious problems.

3. Conclusions

The benefits from improving social development are saved lives, avoidance of human suffering, and improved quality of life. Still, the issue at hand is different. It is hypothesized, that these improvements bring about a better economic performance. In order to investigate this we employ panel data estimation.

The investigation carried out in the study point to a positive relation between growth and FDI and trade. Our previous empirical results (FEMISE, 2010) demonstrated earlier that the social development measures are important in determining FDI and trade patterns. These are in turn significant as growth determinants. However, the majority of social variables were not significantly directly related to GDP growth. The variables measuring health, education, inequality were insignificant in the statistical investigation. The results suggest that proponents of efforts to improve health, education, and inequality should rely on humanitarian rather than economic arguments.

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